National Institute of Environmental Health Sciences

Methods to calculate the heat index as an exposure metric in environmental health research

Author(s): Brooke anderson G, Bell ML, Peng RD
Year: 2013
Journal: Environmental Health Perspectives. 121 (10): 1111-1119

Abstract:

Background: Environmental health research employs a variety of metrics to measure heat exposure, both to directly study the health effects of outdoor temperature and to control for temperature in studies of other environmental exposures, including air pollution. To measure heat exposure, environmental health studies often use heat index, which incorporates both air temperature and moisture. However, the method of calculating heat index varies across environmental studies, which could mean that studies using different algorithms to calculate heat index may not be comparable. Objective and Methods: We investigated 21 separate heat index algorithms found in the literature to determine a) whether different algorithms generate heat index values that are consistent with the theoretical concepts of apparent temperature and b) whether different algorithms generate similar heat index values. Results: Although environmental studies differ in how they calculate heat index values, most studies' heat index algorithms generate values consistent with apparent temperature. Additionally, most different algorithms generate closely correlated heat index values. However, a few algorithms are potentially problematic, especially in certain weather conditions (e.g., very low relative humidity, cold weather). To aid environmental health researchers, we have created open-source software in R to calculate the heat index using the U.S. National Weather Service's algorithm. Conclusion: We identified 21 separate heat index algorithms used in environmental research. Our analysis demonstrated that methods to calculate heat index are inconsistent across studies. Careful choice of a heat index algorithm can help ensure reproducible and consistent environmental health research.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3801457

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Temperature

Air Pollution: Interaction with Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Methodology, Other Projection Model/Methodology

Other Projection Model/Methodology: heat indices

Resource Type: ☑

format or standard characteristic of resource

Research Article, Research Article

Timescale: ☑

time period studied

Time Scale Unspecified